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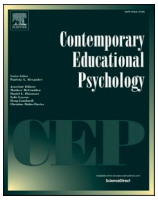

Development of school engagement and burnout across lower and upper secondary education: Trajectory profiles and educational outcomes

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ABSTRACT

Inter- and intraindividual differences in Finnish adolescents' developmental trajectories of school engagement and burnout (exhaustion, inadequacy, and cynicism) and their associations with students' concurrent progression in mathematics performance and educational aspirations were investigated in an accelerated longitudinal study design spanning ages 13–17 ($N = 1131$, 50.9% girls). Growth mixture modeling analyses identified four distinct trajectory profiles: *Positive academic well-being* (high and stable engagement, low and stable burnout), *Negative academic well-being* (low U-shaped engagement, increased burnout), *Disengaged* (low U-shaped engagement, but also low and stable burnout), and *Declining academic well-being* (declining but U-shaped engagement, increasing burnout). Most students experienced a positive change in their trajectories after entering upper secondary education. Furthermore, students in the *Positive academic well-being* group performed better and progressed faster in mathematics and reported higher educational aspirations. Students in the *Declining academic well-being* group started out with high performance and aspirations, but they progressed at a slower rate in mathematics and lowered their aspirations over time. The *Disengaged* students' performance progressed at the slowest rate of all groups, and they had one of the lowest educational aspirations overall. Lastly, students in the *Negative academic well-being* group performed the lowest in mathematics, and had one of the lowest aspirations for future educational degrees.

1. Introduction

Adolescence is a phase characterized by many individual and environmental changes and challenges, and although the majority of students manage adolescence without any severe problems, some seem to experience rather negative shifts in their academic well-being during this time (Roeser et al., 1999). Emotional school engagement and burnout are thought to be important for various educational outcomes and academic adjustment. For example, students who are emotionally engaged in their schoolwork generally perform better in school (Bae et al., 2020; Ladd & Dinella, 2009), have positive motivational beliefs (Tuominen-Soini & Salmela-Aro, 2014; Wang & Eccles, 2013), and aspire for higher educational degrees (Wang & Eccles, 2012). Conversely, students who are burned out by school might become at risk for lower academic achievement (Madigan & Curran, 2021), school dropout (Bask & Salmela-Aro, 2013; Korhonen et al., 2014), lower educational aspirations (Salmela-Aro & Upadyaya, 2017; Widlund et al., 2020), and overall negative well-being (e.g., depressive symptoms; Gerber et al., 2015).

Although relatively little is known about the long-term development of academic well-being during adolescence, general, often negative, shifts have been found to occur in both school engagement and burnout, particularly around the transition to post-comprehensive education (Bask & Salmela-Aro, 2013; Wang et al., 2015). However, significant variations have been found in these trajectories, indicating that not all students follow the same developmental trends (Engels et al., 2017; Salmela-Aro & Upadyaya, 2014a). Person-centered studies have also concluded that associations between school engagement and burnout differ among adolescents. For example, some students may be highly engaged in their schoolwork with no signs of school burnout, others emotionally disengaged from school with elevated levels of burnout, and yet others simultaneously highly engaged in their schoolwork while experiencing exhaustion due to school demands (Salmela-Aro & Upadyaya, 2020; Tuominen-Soini & Salmela-Aro, 2014). These patterns of

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school engagement and burnout have been found to be differentially associated with various educational outcomes (e.g., academic performance, school drop-out; Korhonen et al., 2014). It therefore appears important to shed more light on the individual differences in students' long-term, co-developmental patterns of school engagement and burnout during adolescence, and the ways in which these trajectories might relate to important educational outcomes, such as academic performance and educational aspirations.

More specifically, the aim of the current study was to investigate both inter- and intraindividual differences in adolescent students' long-term co-development of school engagement and burnout (i.e., exhaustion, inadequacy, and cynicism) during lower secondary education and across the critical transition to post-comprehensive education (spanning Grades 7–11). Also, as there seem to be some differences in students' academic well-being with respect to individual characteristics (e.g., gender), and considering that school engagement and burnout have been found to be differentially associated with several educational outcomes, we also investigated whether students' individual trajectories of school engagement and burnout would be differently associated with gender, socio-economic status (SES), performance in mathematics, and domain-general educational aspirations.

1.1. School engagement and burnout

Although the definitions and conceptualizations vary in previous research, many researchers agree that academic well-being is a multidimensional phenomenon consisting of cognitive as well as affective dimensions, and it has been described as comprising both the presence of positive (e.g., engagement) as well as the absence of negative indicators (e.g., burnout) (see e.g., Hascher, 2008; Huppert & So, 2013; Tov, 2018). Considering also that studies utilizing a person-centered approach have found that both positive and negative indicators seem to co-exist for some students (i.e., high levels of both engagement and exhaustion), it seems highly relevant to include both aspects when studying adolescents' academic well-being (Salmela-Aro & Read, 2017; Tuominen-Soini & Salmela-Aro, 2014). Therefore, school engagement and burnout were chosen as indicators of academic well-being in this work, comprising both positive and negative aspects, as well as both cognitive (i.e., students thoughts about school and themselves as students) and affective (i.e., students feelings about school and themselves as students) components of students subjective well-being directly related to school and schoolwork (Diener et al., 2018, see also Putwain et al., 2020). School engagement and burnout have been commonly combined indicators of school related well-being in previous studies (see e.g., Cadime et al., 2016; Fiorilli et al., 2017; Kinnunen et al., 2016; Salanova et al., 2010; Tuominen et al., 2020).

Furthermore, the demands-resources model in education (DR; Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014b), in which school engagement and burnout are key outcomes, highlights the importance of investigating engagement and burnout as parallel processes. According to the DR model, students encounter many different study-related demands (e.g., from learning activities, time pressures, achievement expectations, and changes in the physical environment), but also hold both personal and contextual resources. Resources in school are thought to promote school engagement and "buffer" negative effects of study demands, as individuals who are highly engaged in their studies are more motivated to stay engaged and also create their own resources, thus creating a "gain spiral" (Hobfoll et al., 2018; Hoferichter, Hirvonen, & Kiuru, 2021; Sonmark & Modin, 2016). However, similar causal and reciprocal effects have been found in the energy-depleting process as well, indicating that individuals who experience high strain or burnout, might also undermine the benefits of study resources, and are more likely to engage in self-undermining behaviour, and are therefore more likely to create more demands over time, thus, creating a risk for a "loss spiral" (Bakker & Demerouti, 2017; Hobfoll et al., 2018).

Thus, in order to gain a deeper understanding of the developmental processes of academic well-being during adolescence, it is important to study both the motivational (school engagement) and the energy-depleting (school burnout) processes simultaneously (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014b).

School engagement has typically been described as a multidimensional construct, often comprising an affective, cognitive, and behavioral component (e.g., Appleton et al., 2006). However, grounding on work-related engagement (e.g., Schaufeli et al., 2002; Schaufeli et al., 2006), school engagement has recently also been described as a more focused construct, emphasizing the affective component of school engagement by describing students' psychological engagement in greater detail. In this framework, school engagement is defined as a cognitive-affective state defined as a positive, fulfilling, study-related state of mind comprising three components: energy, dedication, and absorption (Salmela-Aro & Upadyaya, 2012; Schaufeli et al., 2002). Energy is characterized by high levels of vigor while studying, interest and willingness to invest in schoolwork, as well as having effective strategies for coping with difficulties. Dedication is described as having positive cognitive attitudes towards school and being dedicated about learning processes and outcomes, while absorption implies feelings of competence and being fully concentrated and involved in one's studies. These dimensions are separate constructs, but highly correlated with each other (Salmela-Aro & Upadyaya, 2012). It has been suggested that among younger students, the sub-dimensions of school engagement are better described as an overall engagement construct, whereas later, for example, among university students, they seem to become more separated (Salmela-Aro & Upadyaya, 2012; see also Schaufeli et al., 2002).

Recently, studies have increasingly approached students' emotional disaffection with school from the perspective of school burnout (see e.g., Fiorilli et al., 2014; Salmela-Aro & Upadyaya, 2014b; Paloș et al., 2019). School burnout emerges as a negative response to ongoing difficulties in coping with school-related stress and pressure to achieve (Fiorilli et al., 2017; Schaufeli et al., 2002), and it has commonly been defined as comprising three separate dimensions: exhaustion due to school demands, feelings of inadequacy regarding one's competence, achievement, and accomplishments as a student, and cynical and detached attitudes toward school in general (Bresó et al., 2007; Salmela-Aro et al., 2009; Schaufeli et al., 2002). These dimensions are closely related, but they have been found to be differentially associated with various school-related outcomes (e.g., achievement; Salmela-Aro & Upadyaya, 2014a; motivation; Parhiala et al., 2018).

Although overall associations on the general sample level indicate that school engagement and burnout are negatively associated with each other, research has suggested that school burnout does not simply reflect the absence of school engagement, but rather, that it is a separate and distinct psychological process that contributes uniquely to student outcomes in school (see e.g., Leiter & Maslach, 2017; Skinner et al., 2008). For example, person-centered studies focusing on both school engagement and burnout have found groups of students with high levels of school engagement and low levels of burnout, students who disengage from school and report elevated levels of burnout, as well as asynchronous profiles showing various patterns of school engagement and burnout (Salmela-Aro et al., 2016; Widlund et al., 2018). Among both Finnish and US adolescents, researchers have identified groups of students who report high levels of school engagement, but also, elevated levels of study-related exhaustion (May et al., 2020; Salmela-Aro & Upadyaya, 2020), while some students have been identified showing signs of disengagement from school, without experiencing school burnout (Salmela-Aro & Read, 2017; Widlund, Tuominen, & Korhonen, 2018). These findings suggest that high engagement might not always be a completely positive experience, and that it might be precisely the high commitment to school that makes some students more vulnerable to emotional distress and exhaustion (see Roeser et al., 1998; Tuominen-Soini & Salmela-Aro, 2014), whereas lower school performance, values and engagement does not necessarily make all students stressed out over or overwhelmed by schoolwork in general (Widlund et al.,

2018). High engagement and exhaustion may reflect the assumptions made by the DR theory when both resources and demands are perceived as high, whereas disengagement, without experiencing burnout, may reflect students who perceive both low demands and resources (Bakker & Demerouti, 2017; Salmela-Aro & Read, 2017). Thus, it seems that the underlying processes of demands and resources may be reflected in students' school engagement and burnout profiles, and could potentially explain some shifts in their respective trajectories over time.

1.2. Developmental changes in school engagement and burnout

Studies have identified some negative shifts in students' academic well-being and motivation during the adolescent years, and these seem to occur particularly around educational transitions (Engels et al., 2017; Salmela-Aro & Tynkkynen, 2012; Wang et al., 2015). According to the stage-environment fit theory (Eccles & Midgley, 1989; Eccles & Roeser, 2011), changes in students' academic well-being might be due to a mismatch between the needs of the individual (student) and the opportunities offered by the environment (school). Such changes may be determined, for example, by the match between students' need for autonomy and classroom decision-making opportunities (Patall et al., 2010), and the contribution of teacher- and peer relationships for autonomy, competence and relatedness (Olivier et al., 2021; Zimmer-Gembeck et al., 2006). As educational transitions are often associated with emphasized competition, increased social comparison, academic demands, performance goal orientation, and disruptive social relations (e.g., changing peer groups and teachers), these may easily be at odds with the changing needs of the students, as early adolescence is often characterised by, for example, several biological changes associated with pubertal development, heightened self-awareness, and increased desire for autonomy and relatedness (Eccles & Roeser, 2009). Thus, adolescents' academic well-being is largely determined by the extent to which the lower and upper secondary schools provide educational and social environments that meet students' changing needs. As the stage-environment fit is repeatedly reassessed during early adolescence and educational transitions, it seems highly relevant to study the developmental trajectories of students' academic well-being during this time period (Eccles and Roeser, 2011).

From studies examining the general mean level trends in school engagement and burnout, it has been concluded that engagement typically decreases during the adolescent years (Wang & Eccles, 2012; Wang et al., 2015), whereas school burnout and emotional disaffection with school seem slightly more stable (Engels et al., 2017; May et al., 2020; Salmela-Aro et al., 2008). However, in person-centered studies examining the individual differences in engagement and burnout trajectories, several distinct groups of students following similar trajectories during the adolescent years have been identified. For example, Hoferichter et al. (2008) described several stable engagement trajectories (affective, cognitive, and behavioral components) among students aged 12–16 years, with varying initial mean levels of engagement, but also both decreasing and increasing engagement trajectories. Li and Lerner (2011), in turn, found several decreasing emotional engagement trajectories, with varying mean levels, among students in the same age group.

Similarly, individual differences have also been detected in trajectories of school burnout. Salmela-Aro and Upadyaya (2014a) found that although the majority of Finnish lower secondary students displayed rather low initial mean levels of school burnout (considered as a unidimensional construct) and followed rather stable developmental trajectories, approximately one third of the participating students belonged to groups characterized by an increase in school burnout during the transition to post-comprehensive education. However, in upper secondary education, school burnout seems to become more stable; both Salmela-Aro and Upadyaya (2014a) and Sorkkila et al. (2020) found mostly stable trajectories among students in upper secondary education, which mainly differed in the initial mean levels of burnout. Nevertheless, a small group of students whose levels of school burnout continued to increase during upper secondary education was also identified in both studies. Similarly, May et al. (2020) found that 66% of US university students displayed relatively stable trajectories of school burnout, but also, that a third of the students showed a slowly increasing school burnout trajectory over time.

Studies investigating the co-development of school engagement and burnout by means of a person-centered approach are scarce. Widlund et al. (2018) investigated the short-term development of school engagement and burnout as well as mathematics performance and self-concept among adolescents in Grades 7 and 9 and found the profiles to be rather stable during one school year. Furthermore, Tuominen-Soini and Salmela-Aro (2014) investigated profiles of school engagement and burnout among upper secondary school students, and later, among the same participants in young adulthood. They found that students belonging to a profile characterized by high engagement and low burnout in upper secondary school were likely to belong to the same engaged group six years later in young adulthood, whereas students identified as being both engaged and exhausted seemed to show more negative development, as they typically moved to a more negative engagement and burnout profile.

1.3. Gender, SES, and educational outcomes

Studies have typically found girls to be slightly more engaged in school than boys (Salmela-Aro & Upadyaya, 2012), but studies also exist where no gender differences have been found (Bae et al., 2020; Wang & Peck, 2013). However, girls seem to consistently express higher levels of exhaustion and feelings of inadequacy towards school (Salmela-Aro et al., 2008; Salmela-Aro & Tynkkynen, 2012), and girls have been found overrepresented in student profiles characterized by both high school engagement and burnout (Tuominen-Soini & Salmela-Aro, 2014; Widlund et al., 2018). Such gender differences in exhaustion have been explained by, for example, self-esteem aspects and motivation. Herrmann et al. (2019) found that girls reported lower global self-esteem and that their feelings of self-worth depended more on academic success compared with boys, and that such negative self-worth patterns were related to increased levels of exhaustion through motivation regulation (i.e., increased extrinsic motivation and decreased intrinsic motivation). Thus, it seems that girls' academic success might be slightly more at risk of coming at the cost of higher levels of exhaustion (Schöne et al., 2015).

Research regarding differences in the developmental patterns of school engagement and burnout with respect to gender and SES is scarce, and results are rather mixed. Li and Lerner (2011) found that US boys and students from lower income families were more likely to belong to less favorable school engagement trajectory groups, whereas girls and students from higher income families were overrepresented in the more positive groups (Li & Lerner, 2011). However, in Finland, where socioeconomic differences are relatively small, Wang et al. (2015) found no significant effects of either gender or SES on adolescents' overall development of school engagement or burnout, whereas Salmela-Aro and Upadyaya (2014a) found that it was typical for boys to belong to a low and stable burnout trajectory, whereas girls typically belonged to a high and decreasing trajectory.

As to educational outcomes, the general trend seems to be that high school engagement is associated with higher academic performance particularly in mathematics (Bae et al., 2020) as well as higher educational aspirations (Gutman & Schoon, 2018), whereas school burnout has been linked with low academic performance, lowered aspirations, and school dropout (Bask & Salmela-Aro, 2013; Korhonen et al., 2014; Widlund et al., 2020). However, several recent findings suggest that high-achieving, committed, and motivated students who value schoolwork and aspire for higher educational goals might also be vulnerable to some emotional distress and exhaustion at school (see e.g., Parhiala et al., 2018; Tuominen-Soini & Salmela-Aro, 2014; Widlund et al., 2018).

Furthermore, there seem to be some differences also in the developmental patterns of school engagement and burnout with respect to educational outcomes. Both Hoferichter et al. (2008) and Li and Lerner (2011) found that stable trajectories of school engagement or trajectories with higher mean levels of engagement were beneficial for overall academic achievement, whereas students belonging to unstable and decreasing engagement groups were more likely to drop out of school (Hoferichter et al., 2008) and experience depressive symptoms (Li & Lerner, 2011). Similarly, Salmela-Aro and Upadyaya (2014a) found that it was more typical for students with lower educational expectations to belong to a high and decreasing school burnout trajectory during the transition to post-comprehensive education, whereas students following a low and increasing burnout trajectory were more likely to achieve their educational goals compared with students with more average and stable trajectories, and with students in high and decreasing groups.

1.4. The present study

In sum, although the general assumption is that engagement and burnout processes are negatively associated, person-centered studies inform us that i) school engagement and burnout are differently related among students, and ii) not only students who disengage from school and experience school burnout, but also those who are simultaneously engaged and exhausted in school might be vulnerable to some less favorable educational outcomes, such as inferior academic performance within the first group, and lowered educational aspirations within the latter. Recent studies also suggest that iii) there are significant individual variations in both school engagement and burnout trajectories, and iv) students experiencing elevated levels of exhaustion, despite being engaged in their schoolwork, might be at risk of developing more negative well-being patterns over time, particularly during educational transitions.

Furthermore, v) girls seem to express slightly higher school engagement, exhaustion, and inadequacy than boys, but the relation between gender and SES and the developmental patterns of engagement and burnout are still unclear. Similarly, previous work tells us that vi) high levels of school engagement and low levels of school burnout are beneficial for students' mathematics performance (Bae et al., 2020), as well as for several important aspects involving their future studies (e.g., school value, educational goals; Salmela-Aro & Upadyaya, 2014a; school drop-out; Korhonen et al., 2014). Regardless, to date, no study has investigated individual co-developmental relations between school engagement and burnout, and students' concurrent academic performance and educational aspirations.

Building upon these empirical findings and on recommendations from theory (demands-resources model, stage-environment fit theory), the present study aimed to extend prior research by i) using an accelerated longitudinal study design to investigate the long-term development of students' school engagement and burnout (exhaustion, inadequacy, and cynicism) during lower and upper secondary education (7th to 11th grade); ii) combining both positive (engagement) and negative (burnout) indicators of academic well-being to provide more differentiated insights to the associations between students' school engagement and burnout processes during adolescence; and iii) using a person-centered approach to identify distinct groups of students who follow similar school engagement and burnout trajectories. Finally, iv) we aimed to investigate further how different trajectories of school engagement and burnout are related to students' background variables (i.e., gender, SES) and their concurrent performance in one key academic domain (mathematics) and educational aspirations (i.e., highest aspired academic degree). Three research questions were addressed:

1. What kinds of developmental trajectories of school engagement and burnout can be identified from 7th grade to upper secondary education?

Because of the scarcity and mixed results of prior research on this topic, no specific hypothesis regarding the number and shape of school engagement and burnout trajectories were made. However, based on previous studies (Salmela-Aro & Upadyaya, 2020; Tuominen-Soini & Salmela-Aro, 2014; Widlund et al., 2018), we expected to find groups of students with adaptive profiles characterized by high levels of engagement and low burnout (H1), and, also, students with maladaptive profiles characterized by low engagement and elevated levels of burnout (H2). Also, some asynchronous profiles with varying mean levels of engagement and burnout were expected, representing, for instance, high engagement but also high exhaustion, or low engagement yet no notable symptoms of burnout. Overall, we expected to find both increasing and decreasing trajectories of school engagement and burnout over time, and that these fluctuations would appear particularly around the transition to post-secondary education (Eccles & Midgley, 1989; Salmela-Aro & Upadyaya, 2014b). More specifically, we expected that students with more adaptive profiles would follow more stable engagement and burnout trajectories over time (H3), whereas students with more maladaptive profiles would experience pronounced, negative changes in their trajectories (H4) (Salmela-Aro & Upadyaya, 2014a).

2. How are background variables (gender, SES) related to students' trajectory profiles?

Considering the scarcity and mixed results of studies investigating differences in gender and SES in relation to the developmental patterns of school engagement and burnout, no specific hypotheses regarding gender and SES were set.

3. How are concurrent educational outcomes (mathematics performance, educational aspirations) related to students' trajectory profiles?

We hypothesized that groups characterized by more positive and stable development of school engagement and burnout would perform better in mathematics and aspire for higher educational degrees (H5), whereas the opposite associations were expected for students following more maladaptive profiles (H6, Bae et al., 2020; Hoferichter et al., 2008; Tuominen-Soini & Salmela-Aro, 2014).

1.5. Context

Compulsory schooling in Finland consists of primary school (Grades 1–6, ages 7–12) and lower secondary school (Grades 7–9, ages 13–15). At the end of Grade 9, students can choose between general or vocational upper secondary education, both lasting 3–4 years. There is also a possibility to obtain a double qualification, which implies attending courses in both general and vocational upper secondary schools. After completing either general or vocational upper secondary education, students can apply to higher education.

2. Method

2.1. Participants and procedure

Data came from a longitudinal research project (*FRAM: Adolescents' well-being and learning in future society*) at the Åbo Akademi University, utilizing an accelerated design, following students over a period of 4 years. Institutional Review Board approval was not obtained for the research project, as it was not required by our University when the data collection started. However, APA ethical standards and the ethical guidelines of the Finnish National Board on Research Integrity were carefully followed in the conduct of the whole project. Participation in the study was voluntary, informed consent forms were collected from the students' parents, and the participants were assured of the confidentiality of their responses. Five public lower secondary schools from

different regions of Swedish-speaking areas of Finland participated in the initial data collection. Swedish is the second official language in Finland, and of the participating students, 54% had Swedish as the language spoken at home, 28% spoke both Swedish and Finnish, 3% spoke Finnish, and 4% spoke another language. The remaining students did not report their home language. Overall, Finland is a relatively homogenous country regarding both socioeconomic status (see Table S1 in the supplementary material) and ethnicity: only 8% of the whole population has an ethnicity other than Finnish (Official Statistics of Finland, 2019).

The participants were initially recruited in lower secondary school in the fall (T1) and spring (T2) of the school year 2016–2017, when they were in Grade 7 (Cohort 1) and Grade 9 (Cohort 2). The same participants were followed up two years later, in the fall (T3) and spring (T4) of the school year 2018–2019, when they were in Grade 9 (Cohort 1) and Grade 11, that is, studying in upper secondary education for the second year (Cohort 2), respectively. The cohorts were then merged together to enable the estimation of a range of trajectory points from 7th to 11th grade (ages 13 to 17). By doing so, 6 measurements representing school engagement and burnout scores in the fall and spring of 7th, 9th, and 11th grade were estimated for every student. Timepoints for which we did not have data were entered as incomplete data. The full information maximum likelihood approach implemented in Mplus was used in all analyses to deal with missing data (Graham, 2008). This approach takes all available information into account when estimating the model parameters.

In the present analyses, we used data from all students who had reported their school engagement and burnout at least once across the four waves of data collection (see Table 1), resulting in a total of 1131 students (50.9% girls) from the original cohorts ($n_{Cohort1} = 622$, $n_{Cohort2} = 509$).

Of the students in Cohort 2 ($n = 509$), 54% chose the academic track as their upper secondary education, 26% chose a vocational track, while 6% chose a combination of an academic and a vocational track. The remaining students did not report their choice of upper secondary education. After the transition to post-comprehensive education, there was naturally higher attrition in participants, as there were some difficulties in locating and contacting students, while some decided to withdraw participation in the study. The missing data patterns of the four time points in Cohort 2 were examined with Little's MCAR test, which indicated that data was missing completely at random (MCAR) ($\chi^2(267) = 299.838$, $p = 0.081$).

2.2. Measures

2.2.1. School engagement

School engagement was measured with the Schoolwork Engagement Inventory (EDA; Salmela-Aro & Upadyaya, 2012). The inventory consists of nine items measuring energy (e.g., *When I study, I feel that I am bursting with energy*), dedication (e.g., *I am enthusiastic about my studies*), and absorption (e.g., *Time flies when I am studying*) in relation to schoolwork. The items were assessed through a seven-point Likert-type scale ranging from 1 (*never*) to 7 (*every day*). A composite score was computed from all items to indicate overall schoolwork engagement in the present study (see Table S3 in the supplementary material).

Table 1
Sample description by cohort and grade level at each time point of data collection.

Time	Cohort 1 (% of total)	Cohort 2 (% of total)
Time 1: Fall 2016		
Grade level	Grade 7	Grade 9
N	568 (91%)	473 (93%)
Time 2: Spring 2017		
Grade level	Grade 7	Grade 9
N	545 (88%)	444 (87%)
Time 3: Fall 2018		
Grade level	Grade 9	Grade 11
N	450 (72%)	213 (42%)
Time 4: Spring 2019		
Grade level	Grade 9	Grade 11
N	431 (69%)	144 (28%)
Total: T1–T4		
N	622 (100%)	509 (100%)

2.2.2. School burnout

School burnout was assessed by the School Burnout Inventory (SBI; Salmela-Aro et al., 2009), using a six-point Likert-type scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). The SBI scale consists of three subscales: exhaustion (e.g., *I feel overwhelmed by my schoolwork*), inadequacy (e.g., *I often have feelings of inadequacy in my schoolwork*), and cynicism (e.g., *I feel that I am losing interest in my* schoolwork) (see Table S3 in the supplementary material).

2.2.3. Mathematics performance

Mathematics performance was assessed at T1–T4 (Grades 7 and 9) with a standardized online assessment test (KTLT; Räsänen et al., 2013). The test consists of adaptive multiple-choice questions and open questions on basic arithmetic, applied problem solving, and algebra. It is intended for Grades 7–9 (13–15 years). The score students obtain in the test is based on an item response theory model calculated from a nationally representative sample of students ($M = 100$, $SD = 15$).

2.2.4. Educational aspirations

At T1–T4, two statements representing students' idealistic and realistic educational aspirations were combined to represent overall educational aspirations: *highest academic degree I want to achieve* and *highest academic degree I will probably achieve*, assessed using a 4-point ordinal scale (1 = *comprehensive education,* 2 = *vocational upper secondary education*, 3 = *university of applied sciences*, and 4 = *university*).

2.2.5. Socioeconomic status

Students' parents' education and current occupation were coded according to Official Statistics of Finland's (n.d.) social classification based on education and occupation. A new variable was created based on the mean score of each parents' education and occupation, to represent students' SES.

Descriptive statistics, internal consistencies, and correlations between all variables are presented in Table S1 and S2 in the supplementary material.

2.3. Data analysis strategy

All analyses were carried out in Mplus version 8 (Muthén & Muthén, 1998–2017). The full information maximum likelihood (FIML) approach, which takes all available information into account when estimating model parameters, was used in all analyses to deal with missing data (Graham, 2008). Analyses began with examining the structural validity of each measurement through confirmatory factor analysis (CFA, Table S3 in the supplementary material), as well as establishing longitudinal measurement invariance of each well-being measure through longitudinal confirmatory factor analysis (LCFA, see Table S4 in the supplementary material), separately for each cohort.

Growth mixture modeling (GMM; Muthén, 2004) was performed as a multistep process to examine trajectories in school engagement and burnout (exhaustion, inadequacy, and cynicism). The steps encompassed (a) examination of the functional form of change across the sample using latent growth models (LGM), and (b) class identification using latent profile analysis (LPA; see Petras & Masyn, 2010). Due to the complexity of the models, the LGMs were performed separately for all measures. Differences between classes in student characteristics were examined using ANOVAs and chi-square tests. Lastly, we examined whether students with different school engagement and burnout

trajectories differed with respect to their trajectories of mathematics performance and educational aspirations, by using multiple group LGMs.

In the first step, we examined the shape of growth over time using LGMs. Considering that we investigated a relatively long time period (including 6 time points), and that the educational transition from lower to upper secondary education may likely trigger some changes in both engagement and burnout for students, both linear and nonlinear (i.e., quadratic) growth models were tested for all constructs. Including quadratic growth parameters enabled us to capture intraindividual patterns of development that might for example first show an increasing trend during lower secondary education and then a decrease during upper secondary education. The models included a latent intercept factor as well as a linear growth factor or a linear and a quadratic growth factor, respectively. The loadings of the observed variables across Times 1–6 were fixed to 0, 1, 4, 5, 8, and 9 on the linear change factor to account for the difference in intermediate time-differences between data collection points. The residual variances were allowed to be freely estimated, except for inadequacy at Time 1, which was fixed to 0 due to a negative residual. We also tested models where cohort and gender were added as covariates to control for possible effects on the intercept, and the linear and quadratic slope factors for each construct. As socioeconomic differences in Finland are exceptionally small, and previous findings from Finland have found non-significant effects of SES on both engagement and burnout trajectories (Wang et al., 2015), SES was not included as a covariate in the models. In all analyses, chi-square (χ^2), the comparative fit index (CFI: cut-off value close to > 0.95), the Tucker–Lewis Index (TLI: cut-off value close to > 0.95), and the root mean square error of approximation (RMSEA; cut-off value close to < 0.05) were used as model-fit indices.

Next, based on the models chosen in the first step, LPAs were conducted to explore the extent to which distinct trajectory classes of school engagement and burnout could be identified on the basis of the latent intercept and slope factors (linear and quadratic), so that each class represents a different trajectory over time. The goal of LPA is to identify the smallest number of latent classes that optimally accounts for heterogeneity in the data. Models were compared with increasing numbers of classes, and comparison across models was based on the Bayesian information criterion (BIC) fit statistics, the Vuong–Lo–Mendell–Rubin (VLMR) likelihood ratio test, and entropy values. The model with a lower BIC value is considered to provide a better fit to the data, and a resulting p value of <0.05 for VLMR suggests that the estimated model is preferable over the reduced model (Lo et al., 2001). The entropy value ranges from 0 to 1, with values > 0.70 indicating good classification accuracy. Furthermore, the usefulness and interpretability of the latent classes were also considered when choosing the best fitting model.

Next, chi-square tests were performed to examine the distribution of boys and girls, and ANOVAs were conducted to investigate differences in SES. Lastly, linear multiple group LGMs were performed separately for mathematics performance and educational aspirations, with the profiles identified in the LPAs as the grouping variable. In the multiple group LGMs, students' mathematics performance and educational aspirations from the first four time points were used, and the loadings of the observed variables across time were fixed to −5, −4, −1, and 0, so that the spring semester of Grade 9 represented the intercept. Mean level differences in the intercepts and slopes between profiles were examined by using ANOVAs. Effect sizes for the differences in the slope factor between groups were calculated by dividing the difference between the estimated means of two groups at T4, (determined by: intercept (T1) + slope coefficient * time factor) by the pooled standard deviation of the intercepts, as recommended by Feingold (2009).

3. Results

3.1. Growth trajectories of school engagement and burnout

The analysis started with exploring the functional form of growth in students' school engagement and burnout (exhaustion, inadequacy, and cynicism). While comparing growth models including only a linear growth factor with models including both a linear and a quadratic growth factor, we found that either the mean or the variance of the quadratic growth factor for all measures were significantly different from zero, suggesting that the nonlinear models described the data well. Furthermore, all models including both a linear and a quadratic growth factor fitted the data better compared with the models including only a linear growth factor, and therefore, a model that included both a linear and a quadratic growth factor was chosen for all measures (see Table S5 in the supplementary material).

Next, we tested models where cohort and gender were added as covariates, to control for their effect on the intercept and growth factors. The only significant effect of cohort was found for exhaustion, indicating that students from Cohort 2 reported slightly higher feelings of exhaustion. Therefore, cohort was included as a covariate in the final growth model for exhaustion (see Table S6 in the supplementary material). Gender only had significant effects on the intercept of exhaustion and inadequacy, indicating that girls reported slightly higher levels of exhaustion and inadequacy than boys, while gender did not determine the development of engagement or burnout over time. Therefore, and due to the complexity of the models, gender was not included as a covariate in the final models. Instead, gender differences were examined in the final profile solutions, together with socioeconomic status.

3.2. School engagement and burnout trajectory profiles

In the second step, LPAs were applied, to examine whether distinct latent trajectory groups of students could be identified based on their development of school engagement and burnout (exhaustion, inadequacy, and cynicism) from 7th to 11th grade. The results revealed that a four-class solution described the data best (see Table S7 in the supplementary material).

Although the BIC continued to decrease, the VMLR supported the four-class solution, and the entropy value of 0.846 also indicated clear model classification. Although the six- and seven-class solutions also provided clear model classifications, the additional classes only differed slightly in the initial mean levels of school engagement and burnout, while the shape of the trajectories were very similar to those identified in the four-class solution. Considering also that the goal of the LPA is to identify the smallest number of latent classes, and as the four profiles corresponded well with those identified by previous person-centered cross-sectional studies (e.g., Salmela-Aro & Read, 2017; Tuominen-Soini & Salmela-Aro, 2014; Widlund et al., 2018) and seemed to reflect the predictions proposed by the demands-resources theory (Bakker & Demerouti, 2017; Salmela-Aro & Read, 2017) we opted for the four-class solution. The four latent profiles are illustrated in Fig. 1 (for corresponding parameters, see Table 2). When naming the profiles, both the overall mean level of engagement and burnout (with respect to the mid- and endpoints of each scale), as well as the direction of their developmental trajectory (significantly positive, negative, or stable) were considered. However, as the trajectories within the profiles were not completely straightforward, the profiles' overall relation to each other was also acknowledged when labelling the profiles. For class comparisons based on marginal means, see Table S8 in the supplementary material.

Students in the first profile (31.4%) exhibited significantly higher levels of school engagement compared with the other groups, both at the beginning of 7th grade ($p < .001$, $d = 0.6$–1.7), at the end of 9th grade ($p < .001$, $d = 1.3$–2.4), and in upper secondary education ($p < .001$, $d = 1.2$–2.0), and also significantly lower mean levels of school burnout

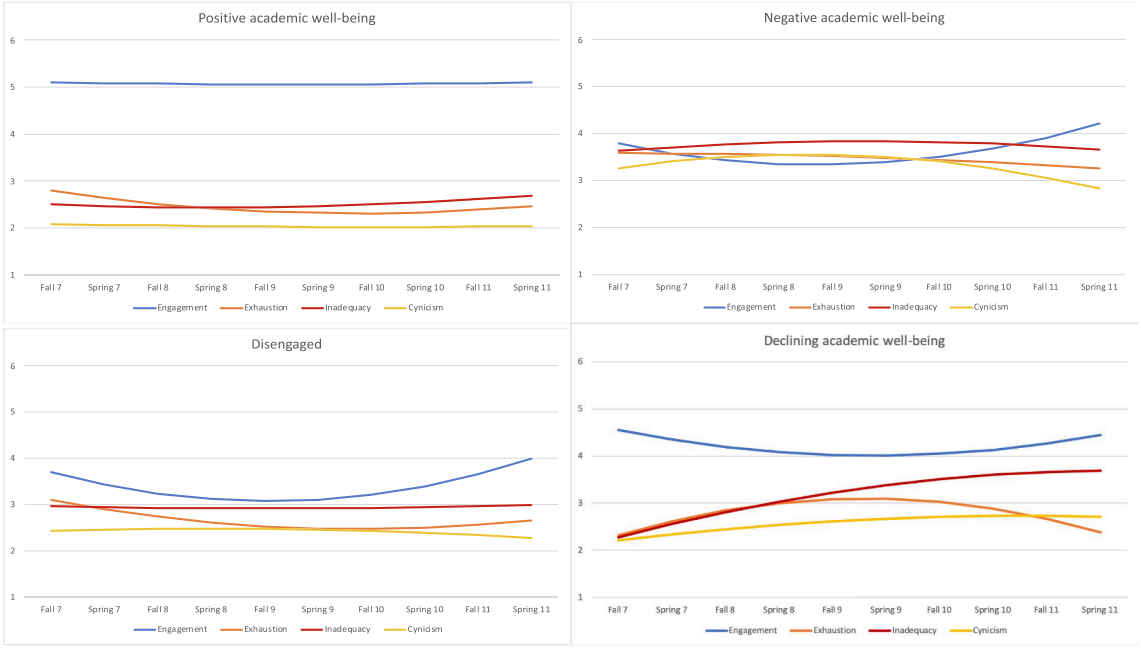

Fig. 1. Schoolwork Engagement and Burnout Trajectory Profiles. Please note that school engagement was measured on a seven-point Likert scale (1–7), whereas school burnout was measured on a six-point Likert scale (1–6).

Table 2
Means in growth parameters for the four latent profiles.

	Positive academic well-being $N = 355$	Negative academic well-being $N = 366$	Disengaged $N = 240$	Declining academic well-being $N = 170$
Engagement				
Intercept	5.094***	3.784_a***	3.709_a***	4.553***
Linear slope	−0.017	-0.240_a***	−0.311***	-0.228_a***
Quadratic slope	0.002	0.032***	0.038***	0.024***
Exhaustion				
Intercept	2.794***	3.581***	3.105***	2.313***
Linear slope	−0.171***	0.000	−0.220***	0.341***
Quadratic slope	0.015***	−0.004	0.019***	−0.037***
Inadequacy				
Intercept	2.494***	3.625***	2.957***	2.272***
Linear slope	-0.041_a**	0.093***	-0.023_a	0.302***
Quadratic slope	0.007***	−0.01***	0.003	−0.016***
Cynicism				
Intercept	2.088_a***	3.257***	2.436***	2.211_a***
Linear slope	−0.024*	0.168***	0.028*	0.137***
Quadratic slope	0.002*	−0.024***	−0.005**	−0.009***

Note. Means within a row sharing the same subscripts are not significantly different from each other. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(except cynicism at T1 and exhaustion at T6 compared to the *Declining academic well-being* group, see Table S8). These students continued to be highly engaged with school during the course of adolescence, while they experienced some increases in all school burnout constructs during lower secondary education. However, all burnout trajectories were leveled out by positive quadratic trends, indicating a small increase, particularly in exhaustion and inadequacy, as students transitioned to upper secondary education. Still, taken together, these students expressed the most positive overall mean levels and stable development of school engagement and burnout, and, therefore, the group was labeled *Positive academic well-being*.

The second group included 32.4% of all students, and, in contrast to the *Positive academic well-being* group, these students expressed relatively low levels of school engagement, and also the highest levels of exhaustion ($p < .001$, $d_{T1} = 0.7$–1.8), inadequacy ($p < .001$, $d_{T1} = 0.9$–1.7), and cynicism ($p < .001$, $d_{T1} = 1.6$–2.2) at the beginning of 7th grade, in comparison to the other groups. The development during lower secondary education was also rather unfavorable, as they experienced a decline in school engagement, while their feelings of inadequacy as students and cynicism towards school increased, widening the gap between the positive academic well-being group even further (Engagement: $d_{T1} = 1.6$, $d_{T4} = 2.0$; Exhaustion: $d_{T1} = 1.1$, $d_{T4} = 1.6$; Inadequacy: $d_{T1} = 1.4$, $d_{T4} = 2.1$; Cynicism $d_{T1} = 2.2$, $d_{T4} = 2.8$). However, these trajectories were leveled out by significant quadratic trends, indicating that they became slightly more engaged and less cynical in school as they transitioned to upper secondary education. Nevertheless, considering that students in this profile expressed the most negative initial academic well-being in the 7th grade, and also exhibited rather negative developments in both school engagement and burnout overall, this group was labelled *Negative academic well-being*.

Also, students in the third profile (21.2%) expressed relatively low levels of school engagement, as well as the most pronounced decline in it during lower secondary education of all groups. In fact, although there was no significant difference in engagement between the *Negative academic well-being* group and these students at the beginning of 7th grade ($p = 0.7$, $d_{T1} = 0.1$), significant differences between the groups were detected later, at the end of 9th grade ($p < .001$, $d_{T4} = 0.3$) and also in upper secondary education ($p < .001$, $d_{T6} = 0.4$). In contrast to students in the *Negative academic well-being* group, however, these students exhibited more positive and stable mean levels of school burnout (Exhaustion: $p < .001$, $d_{T1} = 1.2$; Inadequacy: $p < .001$, $d_{T1} = 1.7$; Cynicism: $p < .001$, $d_{T1} = 0.5$) even showing some decrease in exhaustion during lower secondary education. Their levels of school burnout remained rather low and stable after the transition to upper secondary school, while their engagement with school increased, although still remaining relatively low in comparison to the other groups (e.g., compared to the *Positive academic well-being* group: $p < .001$, $d_{T6} = 2.0$).

Therefore, this group was labeled *Disengaged*.

Lastly, the fourth profile included 15% of all students, and initially at Grade 7, these students expressed rather high levels of school engagement, and one of the lowest levels of school burnout, compared with the other groups. However, during the course of lower secondary education, these students experienced the most rapid linear increases of school burnout, particularly regarding exhaustion and inadequacy. In fact, the gap between students in the *Positive academic well-being* group and these students had grown from initially being rather small or moderate (Exhaustion $p < .001$, $d_{T1} = 0.7$; Inadequacy $p = .01$, $d_{T1} = 0.3$) to relatively large in 9th grade (Exhaustion $p < .001$, $d_{T4} = 1.0$; Inadequacy $p < .001$, $d_{T4} = 1.3$). School engagement followed a similar, but opposite trend, as it followed a moderate, linear decline during the same time period. However, all constructs were leveled out by significant quadratic trends after the transition to upper secondary school, indicating some positive change in their academic well-being during upper secondary education, although their feelings of inadequacy in school still remained rather high (e.g., compared to the *Positive academic well-being* group: $p < .001$, $d_{T1} = 1.6$). This profile was named *Declining academic well-being.*

3.3. Differences in student characteristics

Chi-square tests revealed an association between gender and school engagement and burnout trajectory groups, $\chi^2(3) = 21.507$, $p < 0.001$. Adjusted residuals revealed that there were slightly more boys in the *Positive academic well-being* group ($N_{boys} = 190$, 53.5%, $z = 2.0$, $p < 0.05$) and in the *Disengaged* group ($N_{boys} = 139$, 57.9%, $z = 3.1$, $p < 0.05$), whereas girls were overrepresented in the *Negative academic well-being* group ($N_{girls} = 217$, 59.5%, $z = 4.0$, $p < 0.05$).

Chi-square tests were also conducted to test the distribution of students from the two cohorts within the school engagement and burnout profiles. The results revealed an association also between cohort and profile membership, $\chi^2(3) = 164.995$, $p < 0.001$. Students from Cohort 1 were largely overrepresented in the *Declining academic well-being* group ($N_{Cohort\ 1} = 168$, 98.8%, $z = 12.5$, $p < 0.05$), whereas there were slightly more students from Cohort 2 in the *Positive academic well-being* ($N_{Cohort\ 2} = 188$, 53%, $z = 3.6$, $p < 0.05$) and *Disengaged* ($N_{Cohort\ 2} = 145$, 60.4%, $z = 5.4$, $p < 0.05$) groups. Due to the uneven distribution of cohorts within the profiles, GMMs were performed separately for both cohorts to examine the trajectory profiles for each cohort. The results revealed that a four-class solution fitted the data well for both Cohort 1 and 2, and that the trajectory profiles were largely similar, but with some differences in the proportion of students within the profiles. We discuss this further in the Limitations section in the Discussion.

Next, one-way ANOVAs revealed that there were no significant differences in students' socioeconomic status between the profiles, $F(3, 943) = 2.210$, $p = 0.085$.

3.4. Differences in educational outcomes

Multiple group LGMs for both mathematics performance, $\chi^2(21) = 26.744$, $p = 0.1795$, CFI = 0.993, TLI = 0.992, RMSEA = 0.033, and educational aspirations, $\chi^2(20) = 21.856$, $p = 0.3484$, CFI = 0.998, TLI = 0.998, RMSEA = 0.018, fitted the data well.

The results (see, Table 3 and Fig. 2) revealed that the students in the *Positive academic well-being* group had the highest mathematics performance and educational aspirations in Grade 9, and their performance progressed at the fastest rate from Grade 7 to Grade 9 compared with the other groups. Next, students in the *Declining academic well-being* group had the second highest mathematics performance and educational aspirations of all groups, and they also advanced in mathematics at the second highest rate.

Between the remaining two groups, namely, *Disengaged* and *Negative academic well-being*, there were no statistically significant differences in either mathematics performance or educational aspirations. However, the *Disengaged* students did not differ significantly in mathematics performance from the students in the *Declining academic well-being* group either, but they did have the slowest development of mathematics performance out of all groups from Grade 7 to Grade 9.

Table 3
Means in growth parameters for mathematics performance and educational aspirations for the latent profiles.

	Positive academic well-being	Negative academic well-being	Disengaged	Declining academic well-being
Mathematics performance				
Intercept	116.02	105.17_b	108.02_{ab}	110.40_a
Slope	2.65	1.67	1.36	1.93
Positive academic well-being		$d = 1.13$	$d = 0.71$	$d = 0.58$
Negative academic well-being			$d = 0.27$	$d = 0.50$
Disengaged				$d = 0.16$
Educational aspirations				
Intercept	3.59	3.08_a	3.02_a	3.45
Slope	0.08	0.05_a	0.04_a	0.05_a
Positive academic well-being		$d = 0.78$	$d = 0.81$	$d = 0.22$
Negative academic well-being			$d = 0.08$	$d = 0.56$
Disengaged				$d = 0.59$

Note. Means within a row sharing the same subscripts are not significantly different from each other.

4. Discussion

This study was the first to examine developmental processes of both inter- and intraindividual differentiation in students' engagement and burnout processes in school, during lower and upper secondary education. The main results were the following. First, we found four meaningful trajectory profiles: students with overall adaptive and stable trajectories of high engagement and low burnout (*Positive academic well-being*); students with relatively maladaptive trajectories of lowered, U-shaped engagement and increased, inverted U-shaped burnout (*Negative academic well-being*); and two asynchronous profiles, namely, students with low and fluctuating school engagement trajectories not yet showing signs of school burnout (*Disengaged)*; and students with initially high engagement and low burnout that rapidly shifted during the lower secondary school years, but leveled off after transitioning to upper secondary education (*Declining academic well-being*). In line with the stage-environment fit model (Eccles & Midgley, 1989), significant changes occurred in the majority of all school engagement and burnout trajectories as students transitioned to post-secondary education, supporting previous assumptions that educational transitions seem to trigger both positive and negative changes in students' academic well-being.

Furthermore, some gender differences were detected within the profiles, most notably that there were significantly more girls in the *Negative academic well-being* group, whereas more boys belonged to the *Disengaged* group. No differences in SES were detected, which is not surprising considering the Finnish context and in light of Nordic welfare policy (i.e., free welfare services, such as child benefits, education, parental leave, health services and hospitals). The Nordic countries have some of the smallest variations in socioeconomic status in the world (OECD, 2019). Finally, regarding educational outcomes, we found that the trajectory profiles were associated with both mathematics performance and educational aspirations in meaningful ways, so that students with overall positive and stable trajectories of school engagement and burnout not only performed better in mathematics, but also progressed

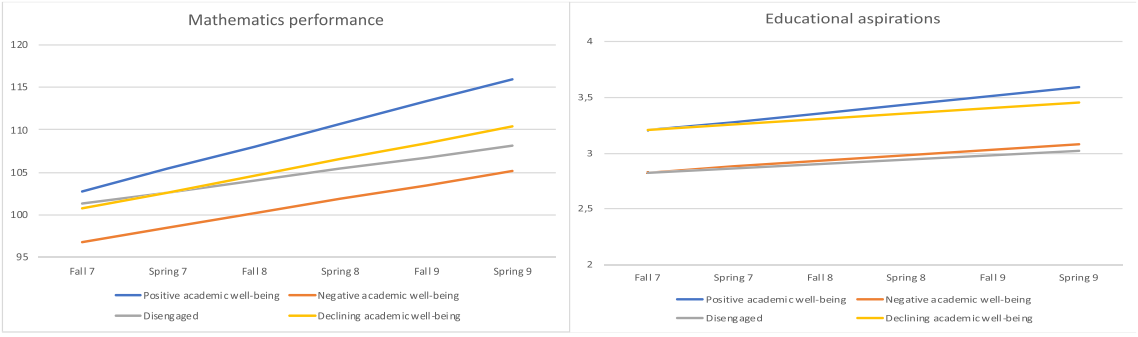

Fig. 2. Trajectories of Mathematics Performance and Educational Aspirations for the Latent Profiles.

at a faster rate, and aspired for higher educational degrees compared with students with more maladaptive profiles. We discuss these findings in greater detail in the following sections.

Concurrent with previous findings (H1), almost one-third of the participating students belonged to the *Positive academic well-being* group. In line with previous research (Hoferichter et al., 2008; Roeser et al., 1999; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2020), these students expressed one of the most adaptive and stable trajectories overall, both during the course of lower secondary education, and across the transition to post-secondary education, confirming our assumptions (H3) that students with initial positive academic well-being might be better equipped to handle possible challenges and changes occurring during adolescence, such as transitioning to post-secondary education. A similar result was observed by Tuominen-Soini and Salmela-Aro (2014), who found the highest temporal stability in school engagement and burnout among students initially highly engaged in school and with low levels of burnout. Furthermore, as we expected (H5), these students also exhibited the highest performance and fastest progression in mathematics and aspired for relatively high educational degrees in comparison to the other groups, indicating that a positive and stable development of academic well-being during adolescence might be linked not only with the overall level of one's performance and aspirations, but also the progression of such outcomes (Roeser et al., 1999).

From a stage–environment fit perspective, it might be that students who enjoy and value school, and are not burned out by school, are likely to experience continued educational success and well-being, which likely has recursive effects on the social and educational school environment: these students are not only likely to hold more personal resources and, therefore, be better equipped to handle potential demands imposed by changes in the educational context, but, they might also be more motivated to stay engaged and even create their own resources when study demands (e.g., work load, time pressure, expectations) are increasing (Bakker & Demerouti, 2017; Martin & Marsh, 2008). For example, in line with the assumptions made by the stage-environment fit theory, Kiuru et al. (2020) found that closeness with peers and less conflict with teachers predicted positive academic well-being (i.e., higher school satisfaction, less school stress) among adolescent students, but also, that a positive academic well-being further contributed to increased closeness to and decreased conflict with both teachers and peers. It therefore appears important to support students' academic well-being in schools, in order to improve educational outcomes.

Another, equally large, group was identified among our sample, showing a rather reversed, maladaptive profile of academic well-being and adjustment, and thus supporting H2. Students in the *Negative academic well-being* group expressed both relatively low and decreasing levels of school engagement and, also, rather high, and slightly increasing levels of school burnout during the course of lower secondary education, partly supporting H4. These students reported high levels of school burnout already in the 7th grade, after a recent transition from primary to lower secondary school, suggesting they were possibly already experiencing elevated levels of school burnout in the earlier school years, or that they have not received appropriate support in their recent educational transition in combination with entering adolescence and puberty. These changes might have contributed to a potential mismatch in their stage-environment fit, causing negative academic well-being patterns (Eccles and Roeser, 2009). Continued negative well-being patterns throughout the lower secondary school years might also indicate that students who are less engaged and more burned out are more likely to engage in self-undermining behavior (Bakker & Demerouti, 2017). Thus, students who experience elevated levels of burnout, might undermine the benefits of study resources, communicate poorly, make more mistakes, and create more conflicts with peers and teachers which, in turn, creates more demands over time (Bakker & Costa, 2014). Previous studies have, for example, detected a reciprocal relationship between school stress and students' perceived conflicts with teachers (Kiuru et al., 2020). These negative developmental patterns are something that should be taken seriously, considering that approximately one-third of the participating students, many of whom were girls, belonged to this group.

However, it is encouraging that students in the *Negative academic well-being* group experienced a positive change in both their engagement and burnout trajectories, as they transitioned to post-secondary education. These results differ slightly from previous findings and our expectations (H4), that is, that educational transitions generally result in negative changes in students' well-being, particularly for those who have shown earlier signs of negative school adjustment (Roeser et al., 1999). Considering that these students also performed the lowest in mathematics in the 7th grade and aspired for lower educational degrees compared with the other groups, it may be that they were more likely to receive support in school, and that the Finnish schools generally do relatively well in terms of meeting the demands imposed by changes in the educational context, particularly for students with known learning difficulties. However, despite positive changes in upper secondary school, their levels of school burnout, particularly inadequacy, still remained rather high after the transition.

Next, students in the third trajectory profile, the *Disengaged* group, expressed a low and decreasing trajectory of school engagement almost identical with students in the *Negative academic well-being* group, but interestingly, they also became less exhausted in school during the lower secondary school years. A similar profile of students expressing rather low school motivation and competence beliefs, despite average psychological well-being was identified by both Parhiala et al. (2018) and Roeser et al. (1998). Tuominen-Soini and Salmela-Aro (2014) also describe a group with slightly lowered engagement and exhaustion, but with increased levels of cynicism towards school. In the present study, cynicism also increased slightly during lower secondary school among the *Disengaged* students. Overall, these results suggest that lower engagement and valuing of school may not necessarily lead to exhaustion and broader patterns of adjustment problems, as some students may be psychologically more detached from school and their well-being affected more by experiences outside school, or their low valuing of school may leave them less stressed when facing different study

demands. These results may also reflect conservation of resource processes (Hobfoll et al., 2018), arguing that when valued resources are lost (e.g., energy), some students might try to minimize the risk of losing more by devaluing school and schoolwork. For example, Roeser et al. (1998) identified a group of students with low and decreasing school value but no psychological distress, who also, initially, experienced a decline in their competence -beliefs. These findings may indicate that students who increasingly feel incompetent in school may start to devalue school to protect their self-worth. Such a protective attitude might hinder students from investing in schoolwork, and consequently, function as a buffer from getting exhausted by school.

However, despite lowered school engagement, students in the *Disengaged* group in this study still performed relatively well in mathematics, but they did have one of the lowest levels of educational aspirations. Wang and Peck (2013) identified somewhat similar patterns, as they identified a group of students reporting low levels of emotional engagement and educational aspirations, who still performed well in school and reported high levels of behavioral and cognitive engagement. These students were also less likely to attend college than their peers who did not show signs of emotional disengagement. However, although the *Disengaged* students performed relatively well, their performance progressed at the slowest rate compared with all other groups. It may be that students in the *Negative academic well-being* group were more likely to receive support for their learning in school, and therefore managed to catch up and advance in mathematics at a faster rate, whereas students in the *Disengaged* group, who initially performed rather well, might have easily gone unnoticed. From a stage-environment fit perspective, it is possible that simply high academic performance and a lack of school burnout does not necessarily lead to continued educational success, if one does not also value and feel emotionally connected to the educational environment (Salmela-Aro & Read, 2017; Wang & Peck, 2013). These results highlight the importance of supporting not only students with learning difficulties, but also those with negative school valuing, as it might slow down the learning processes and possibly hinder these students from reaching their full potential.

However, after the transition to upper secondary education, students in the *Disengaged* group, like students in the *Negative academic well-being* group, experienced a positive change in both school engagement and cynicism, suggesting that the change of educational environment triggered a positive change in their academic well-being. Considering that Finnish students approaching the transition to upper secondary education can, for the first time, choose their academic track, it is possible that students in the *Disengaged* and the *Negative academic well-being* groups found a better fit between their individual needs (e.g., need for autonomy and relatedness) and the opportunities offered in the new secondary school environment (e.g., choice of study program, peers with similar interests and values), and that their well-being, particularly engagement and school valuing, thus increased (Eccles and Roeser, 2011; Roeser et al., 1998).

Finally, a fourth group of students representing 15% of the sample, namely, *Declining academic well-being*, was identified. At the beginning of the 7th grade, this group expressed initially high levels of engagement and low levels of burnout largely similar to students in the *Positive academic well-being* group. However, students in the *Declining academic well-being* group experienced a significant decline of school engagement and became rather rapidly more burned out by school over the course of lower secondary school. Despite their negative development, their engagement with school nevertheless remained relatively high, whereas their levels of exhaustion and inadequacy in school increased from one of the lowest to one of the highest compared with the other groups. In fact, in the 9th grade, their developmental profile resembled groups of students found in previous studies, expressing both increased engagement and exhaustion in school (Salmela-Aro & Upadyaya, 2020; Wang & Peck, 2013).

Previously, engaged and exhausted students have been found to be slightly more stressed by their educational aspirations, preoccupied with possible failures in school, and willing to give up when faced with demanding school tasks, in comparison to students who are engaged but do not show signs of school burnout (Tuominen-Soini & Salmela-Aro, 2014). These results largely concur with those found in the present study. Compared with students in the *Positive academic well-being* group, students in the *Declining academic well-being* group performed lower in mathematics, and their performance also progressed at a slightly slower rate, widening the gap between these groups over time. A similar change occurred in their educational aspirations: in the 7th grade, there were no notable differences in aspirations between the two groups, but in the 9th grade, at the time they were making the important decision regarding their secondary education, students in the *Declining academic well-being* group had slightly lower educational aspirations. Tuominen-Soini and Salmela-Aro (2014) identified a similar result, as they found that engaged-exhausted students were likely to lower their educational aspirations over time, whereas engaged students, who did not report high school burnout, had significantly higher educational aspirations, as well as the most positive educational outcomes later in young adulthood.

In light of the apparent negative effects of school burnout on both performance and educational aspirations (Madigan & Curran, 2021; Salmela-Aro & Upadyaya, 2017), increased feelings of exhaustion and inadequacy in school may affect students' learning processes over time despite high school value, engagement, and performance, and make them downgrade their educational aspirations. Considering that their educational aspirations were still relatively high, it might, in fact, be these students' high educational goals that make them more prone to exhaustion and feelings of inadequacy in school. For example, from a demands-resources theory perspective (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014b), it could be that their perceived study demands (i.e., high workload, time pressure, high expectations) exceed their study resources (i.e., support from peers and teachers), which might contribute to increased school burnout. Nevertheless, considering that these students showed the most negative development of academic well-being in comparison to the other groups, indicates that they fit the least well into the lower secondary school environment (Eccles et al., 1993). Because they still perform well in school, value school, and hold high educational aspirations, might place them at greater risk for getting overlooked by teachers and developing more negative well-being patterns over time, which might possibly hinder them from pursuing further higher education (Wang & Peck, 2013).

However, after entering upper secondary education, the negative trend of academic well-being, except for inadequacy, subsided. It might be that the secondary school context is perceived as less demanding or that in the new school context, they had better achieved their school-related goals, and thus achieved related resources (Salmela-Aro & Upadyaya, 2014b).

5. Limitations and future directions

When interpreting the results, some limitations should be considered. Although the accelerated study design has several strengths, for example, the possibility to examine long-term development, it also comes with some challenges. First, as the case often is in longitudinal studies, the relatively large number of participants who opted to withdraw their participation in the study in upper secondary education needs to be considered when interpreting the results. Second, we identified an uneven distribution of students from the two cohorts belonging to the *Declining academic well-being* group. Although LPAs revealed that a four-profile solution fitted the data well for both cohorts, and the identified profiles were largely corresponding, we found that there was a larger increase in exhaustion among students in Cohort 1, which could partly explain the results. A difference in exhaustion between the cohorts was also confirmed in the initial stages of the analyses, as we found that students from Cohort 2 reported slightly higher feelings of exhaustion, whereas the linear slope was larger for students in Cohort 1. This was

taken into account in the final solutions by including cohort as a covariate in the growth model of exhaustion, but still, it should be acknowledged when interpreting the results.

Furthermore, the context of the study should be considered, given that Finland is a relatively homogenous country regarding socioeconomic status and ethnicity, and that the majority of students from Cohort 2 studied in the academic track. Longitudinal studies with more diverse samples are thus needed to examine the generalizability of our findings across time periods, and educational and cultural contexts. Considering that many students reported relatively high levels of exhaustion in school at the beginning of the 7th grade, it would be important to study trajectories of academic well-being in earlier school years, and particularly across the transition from primary to lower secondary education. Also, given the multidimensionality of students' well-being, several aspects of academic well-being should be considered and examined over time, for example, other aspects of school engagement (e.g., behavioral, cognitive) and different motivational beliefs (e.g., domain-specific value and competence beliefs).

5.1. Practical implications

Overall, the results indicated that many adolescents cope with and adjust to normative life transitions quite well. Nevertheless, many students still experienced some decline in their school engagement, and slightly increased symptoms of school burnout during the lower secondary school years. From a stage-environment fit perspective (e.g., Eccles & Roeser, 2011), these findings are not surprising, considering students' recent transition to secondary school. As in many countries, the transition from primary to lower secondary education in Finland involves transitioning into a larger school building, from having a single class-teacher to several subject teachers, changing peer-groups, and often, increased expectations from parents and teachers, while students are simultaneously entering and going through early adolescence. In fact, previous findings have suggested that negative changes typically occur in students' well-being and motivation during early adolescence (Roeser et al., 1999), and this is something that schools should take seriously. Disengagement, emotional exhaustion, concerns about failure, and cynical attitudes towards school are all serious symptoms of maladjustment and might indicate a perceived misfit between either one's own or the environment's resources, expectations, and demands.

However, most students experienced a shift in their school engagement and burnout trajectories as they transitioned to post-comprehensive education, supporting previous assumptions that educational transitions may spark both positive and negative changes in students' motivation and well-being (Roeser et al., 1999; Salmela-Aro & Upadyaya, 2014a). In fact, for the majority of students, the change was rather positive, suggesting that there might be a better fit between the needs of the students and the opportunities offered by the secondary school environment. When transitioning to upper secondary education in Finland, students are for the first time presented with the choice of choosing their study track (vocational or academic track), and students often have an increased possibility to influence their study program, which might better meet adolescents' need for autonomy. Furthermore, upper secondary school buildings are generally smaller, including fewer peer-groups and teachers, often sharing more similar interests, which may also better meet students' needs of relatedness (Deci & Ryan, 2008).

Nevertheless, it is important to recognize that both academic performance and aspirations for future educational degrees are related to how students feel, view, and experience school and schoolwork, in order to consider alternative ways of meeting their varying needs effectively. Schools should learn to be aware of risks, and attempt to identify groups of students with various types of problems in both their academic and emotional functioning. It seems also important for schools to follow up students' well-being more systematically, considering that one of the most pronounced changes occurred among students who, initially, were highly engaged and also performed well, and may therefore be likely to get overlooked and their potential problems go unnoticed in the secondary school environment.

Furthermore, our results suggest that some students might need support and interventions targeting their low valuing of school and negative feelings towards school by creating more motivation-enhancing learning environments in schools (i.e., *Disengaged* group), others might benefit more from interventions targeting psychological stress and exhaustion, and be offered student welfare services and school counselling (i.e., *Declining academic well-being* group), whereas some would benefit from both types of interventions (i.e., *Negative academic well-being* group) (Meylan et al., 2020; van Loon et al., 2020). As most negative changes in students' academic well-being seem to occur at the beginning of adolescence, such interventions may be particularly important to implement at an early stage, when students are entering adolescence and transitioning from primary to lower secondary education.

6. Conclusion

Although fluctuations were detected in both school engagement and burnout trajectories among adolescents, our results suggest that the majority of Finnish students hold relatively positive and stable levels of academic well-being throughout the adolescent years. Nevertheless, one of the most important implications of our study is the realization that students show various patterns and trajectories of academic well-being that seem to be related to their progression in mathematics performance in meaningful ways, as well as appearing to have some impact on their aspired future educational degrees. Most students seem to be highly engaged, do not show signs of burnout, perform well, and hold high educational aspirations throughout the adolescent years, whereas others show rather stable but opposite patterns of academic well-being and performance. However, for some students, high engagement, performance, and aspirations may come at the cost of increased exhaustion and feelings of inadequacy in school, whereas disengagement, poor performance, and lowered aspirations may not always lead to exhaustion in school, for all students. Nevertheless, we argue that all students would benefit from support targeting not only their learning, but also, their emotional well-being in school.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

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